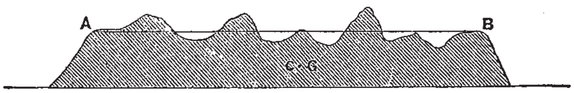
LETTERS TO THE EDITOR

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. No notice is taken of anonymous communications.*]

Error in Humboldt's Cosmos

THE following letter, from Major-General Sir Henry James, is addressed to Mr. J. Carrick Moore in reference to his communication which appeared in our columns under date April 18.

"I am much obliged to you for sending me NATURE, with your letter in it respecting the manner in which Humboldt has used the term 'Centre of Gravity of the Land,' by which he so far misled Herschel as to make him double the height of the mean elevation of the several continents. It is obvious that Humboldt determined the mean height of their surfaces, and not the height of the centres of gravity of the continents. He determined the height of A B; not of C G. The centres of gravity are, therefore, at half the heights given by Humboldt.



"I have the mean elevation of the surface of Forfarshire determined by the same method explained by you, and by which Humboldt determined the mean elevation of the surfaces of the continents; it was 856 feet above the mean level of the sea. The mean height of the surface of Europe (not of the centre of gravity) is, according to Humboldt, 671 feet, and this is quite as high as I should have expected it to be from the known height of Forfarshire, containing so large an amount of mountainous country. The mean height of the surface of Europe cannot be double this, or 1,042. The height of the water-shed between the Baltic, Black, and Caspian seas is only 1,100 feet.

"I think, therefore, both from the method of investigation and from the results, that you have taken a correct view of the subject, and that you have done science a great service in pointing out the error into which Humboldt has fallen, and by which he misled Herschel to so great an extent.

"John Carrick Moore, Esq." "HENRY JAMES

Southampton, April 22

Fertilisation of Dictamnus

AN arrangement for the distribution of the pollen of *Dictamnus Fraxinella*, which I noticed last June, may interest some of the botanical readers of NATURE. The plants will shortly be in flower, so that any one who is curious about the matter can see it for himself.

To suck the nectar of these flowers, bees stand upon the filaments, which are nearly horizontal; as the anthers are matured they are brought up in turn, generally two at a time, by the curving filaments, into such a position that they rub against the tail of a bee standing on the filaments. As soon as each pair of anthers is emptied they retire, and give place to another pair, and when the last are emptied the style curves up, and brings the stigma into the same position.

The difference in appearance between the empty and full anthers is very striking in dry weather.

Any one who knows the plants must have observed that they are very attractive to bees, and that they produce seeds in great abundance. CHRISTOPHER J. HAYDEN

Newspaper Science

THE general public cannot fail to acquire some very extraordinary as well as erroneous notions about many subjects relating to the progress and application of the different branches of Natural Science, if we are to judge from sundry scraps of information, daily communicated or reproduced for their instruction, in the columns of even the most influential newspapers. Amongst recent examples of this style style of information we might refer to the following:—

Geography.—Under the heading, "Oysters from South America," we find in the *Times* of May 16, the announcement that the steamer *Kaffraria* had last Sunday 'arrived at Hull from Norfolk, Virginia, having on board a cargo consisting of 500 or 600 tons of oysters, &c."

Geology.—The following is reproduced from the *Mechanics' Magazine* in the *Times* of May 16: —"*Per saltum.*—Nantwich in Cheshire has for some years past been gradually sinking, owing to the withdrawal of the lime from the salt lakes, which underlie the town," &c.

Chemistry.—In the *Times* of May 9 it is stated that "according to an analysis made by Prof. Zinno, the elements of the ashes that were thrown out from Mount Vesuvius are chlorine of soda, sulphate of lime, magnesia, allumen, iron, titanio, and silex."

Metallurgy.—The *Engineer* of April 12, in a paragraph on early iron making at Merthyr Tydvil, in South Wales, must rather astonish metallurgists by writing of "bones supplying sulphate of lime" in the process.

Architecture.—In a somewhat elaborate article on the new so-called Selenitic mortar, which in reality takes its name from the introduction of a little sulphate of lime, which when native forms the mineral called selenite in its manufacture, we are informed that "the name given to the improved mortar indicates to a certain extent the nature of the improvemeut; that it is in the direction of combining *selenious* acid with a base," &c. It would, indeed, be good tidings to chemists to find that selenious acid had become so cheap as to allow of its being used for such purposes; unfortunately, however, the last price lists inform us that selenium, from which it is made, still costs three shillings per drachm.

Although it has been said that it is not reasonable to expect scientific information from newspapers devoted to general topics, we still contend that we are entitled, when newspapers do make such statements, to demand that they shall at least be free from such gross blunders as those contained in the examples here cited, and to which many others might be added.

London, May 18 D. F.

The University of Freiberg

A LETTER signed "Undergraduate," in NATURE of May 9, confounds the School of Mines in Freiberg in Saxony with the University of Freiburg in Baden. The writer and others who wish to know where certain subjects are best taught in German universities will find much information in Ascherson's "Deutscher Universitäts-Kalender." This small book appears twice a year, giving the number of students and the names of lecturers and lectures offered each term in thirty-one universities of Germany, Switzerland, and the Baltic provinces of Russia.

Berlin, May 16 A. OPPENHEIM

Denudation of the Mendips

IN reply to the question of "Inquirer" in last week's number of NATURE, asking for explanation of a passage in my Address to the Geological Society, allow me to observe that geologists judge of the amount of denudation which hills formed by anticlinal axes, such as the Mendips and Ardennes, may have suffered, by prolonging across the range of hills the outcropping edges of the strata thrown up on the flanks of the axis, keeping each bed and each formation in its relative place. Thus, taking the thickness of the Somerset Coal measures, including the Millstone grit, to be on the north side of the Mendips about 9,000 feet, and of the Carboniferous limestone 1,500 feet; the whole of these, together with some upper part of the Old Red sandstone, forming together a mass of not less than 10,000 to 12,000 feet, have been removed from the area of the Mendips, the central axis of which is formed by strata of Old Red sandstone. In the case of the Ardennes, in addition to the Carboniferous strata, Devonian and Silurian strata are thrown up along the central axis at angles which prolonged form great arches, or rather a series of arches, over the hills; for here and there the intermediate synclinal curves bring in portions of the Coal Measures, which have thus been saved from denudation, while they show how much has been removed in the intermediate areas. The whole of the Coal measures, which are there rather thinner than in Somerset, the Lower Carboniferous series, which is much thicker than in England, together with the Devonian and part of the Silurian series, forming together a thickness probably of not less than 15,000 to 20,000 feet, are there removed from the central area.

It is, however, almost impossible to convey an exact notion of these great physical phenomena without illustrative sections and diagrams; and for these allow me to refer "Inquirer" to some papers in which such sections are given, and in which the subject, a very complicated one, is specially treated, viz., Professor Ramsay "On the Denudation of South Wales and the adjacent

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counties of England" (Memoirs of the Geological Survey of Great Britain, vol. i. p. 297); Dupont's "Essai d'une Carte Géologique des Environs de Dinant" (Bulletin de l'Académie Royale de Bruxelles, vol. xx. pp. 9 and 10); Réunion Extraordinaire de la Société Géologique de France à Liège (Bulletin de la Société Géologique, 2 ser., vol. xx. p. 761); Elie de Beaumont's and Dufrenoy's Explication de la Carte Géologique de la France, vol. i. pp. 240-64; also to Lyell's Elementary Manual of Geology, article, "Denudation;" and to De la Béché's 'Geological Observer,'" p. 815.

Shoreham, Kent, May 18 JOSEPH PRESTWICH

VOLCANOES AND EARTHQUAKES

THE remarkable series of volcanic phenomena which have lately been exhibited at various parts of the earth's surface within so short a period of time, gives much matter for consideration, and must in due time afford us a rich harvest of facts with which to test the numerous theories which have been started to account for the occurrence of volcanic eruptions and of earthquakes. Even from our at present scanty information we have, I think, something to learn.

First in the series, so far as I am aware, was the very severe earthquake at Independence, Inyo County, California, which took place on Tuesday, March 26, commencing at 2 A.M., and lasting till 7 A.M., during which time "the earth was never for a moment perfectly quiet, and every few minutes heavy shocks, of a few seconds' duration, were occurring; in all there were more than fifty very heavy shocks." This place is only fourteen miles from the Black Rock, a volcano in the Sierra Nevada mountains, "the sides of which are covered with lava, and which is supposed to be an extinct volcano." It is stated that "during the time the shocks were most severe, flashes of light were seen to issue from the top of this mountain, and streams of fire ran down its sides."

The result of this earthquake is summed up in a few words as "the whole country turned topsy-turvy" (*Virginia City* (Nevada) *Enterprise*).

Then a few days afterwards came the terrific earthquake in Antioch, which commenced on April 3, and continued with greater or less severity, "in Aleppo, and as far east as Orfa, beyond the Euphrates," for more than a week, becoming very severe on April 10; here there appears to have been no actual volcanic phenomenon; but it appears from the letters of the Rev. W. Brown in the *Times*, that there exists in the immediate neighbourhood a mountain, "the peculiar conical form of which is very suggestive of an ancient volcano."

The latest African news tells us that "Several violent shocks of earthquake had occurred at Accra, on the Gold Coast, on April 14 and 15, causing considerable damage to the place." And as unwonted atmospheric disturbances have often been connected with volcanic phenomena, it may not be out of place to mention here the fearful hurricane which wrecked every vessel but one in the Harbour of Zanzibar on April 15.

And then on April 24 began the recent eruption of Vesuvius, which will be for ever memorable, not only on account of its magnitude and grandeur, but also, and still most so, by reason of the amazing intrepidity of the man, who, from a pure love of science, remained at his post, like the gatekeeper of Pompeii, throughout the whole of that terrible time, but happily was not, like that heroic soldier, buried in a shower of ashes; the world was spared the loss.

Now is there any connection between these phenomena exhibited in so distant parts of the earth's surface? One thing is certain, namely, that within the short space of a month all this has occurred, and one can hardly help thinking that somehow or other these volcanic countries must be connected underground; it has long been thought that Etna and Vesuvius are points on a volcanic area which passes north-west to the Eifel, Auvergne, and Iceland; has the neighbourhood of Antioch, with its unenviable notoriety for earthquakes, or the West African coast, anything to do with this area? But if so, what shall we say of the Sierra Nevada, why should its volcanoes be active at the same time? Why should the country there be "turned topsy-turvy" by earthquakes?

While pointing out these coincidences, we must not jump too hastily to conclusions from them; for on the one hand we are told that although the Antioch earthquake extended so far east, yet, to the north and south, even at a few miles' distance, nothing whatever was observed, and, on the other hand, that the Californian earthquake was of so superficial a character that "at Hot Springs, while severe shocks were felt on the surface, the men in the mines, 200 feet deep, felt nothing of them." Now the evidence goes to show that the latter earthquake was directly connected with the eruption of a volcano in the neighbourhood, so that, although the origin of the disturbance may be underground, possibly at a very considerable depth, the shocks are at a certain distance quite superficial, and moreover are transmitted in certain definite directions.

Taking all these facts together, they would rather seem to favour the conclusions that at any rate a great many, if not all, of the volcanic regions of the world are connected, and that they are not merely parts of the earth's surface which happen to be over isolated subterranean furnaces, but places where access to the exterior is more easy for the molten matter which lies underneath a great part, perhaps all, of the earth's crust. I must not be understood to be upholding the (shall I say exploded?) theory of the internal fluidity of the earth; I merely mean to point out that such coincidences in point of time ought to make one hesitate before rushing to the other extreme, and looking upon volcanoes as mere local eccentricities.

But it will be said, if there is any general commotion under even the volcanic area of Europe, why do not the extinct volcanoes of Auvergne break out again? Here is a difficulty which is not at all solved by the suggestion that at first occurs to one, that as the raising of the country has drained the enormous lakes, on the borders of which these volcanoes stood, there is no longer a supply of water to rouse them into action, for are there not lakes still in the Eifel, nay, are not those lovely lakes actually in the craters of extinct volcanoes?

Again, who has seen the wonderful natural harbour of Messina from the high ground above the town without believing it to be an extinct submerged crater? If there be still liquid rock below these craters, it may be that they are no longer the points of least resistance. And this is the probable explanation of their inactivity; for it must not be imagined that an eruption of Etna or of Vesuvius, or of any other volcano, necessarily means an ejection of ashes, lava, &c., from the crater, or from any crater; not at all, the weakest point in the vicinity gives way, and thus we have the numerous cones formed which surround every considerable volcano for some distance.

The mention of Auvergne leads me to make a few remarks on the disputed point, as to whether or not the volcanoes in that country have been in eruption within historic times, especially as I see that a correspondent in last week's NATURE has come to the conclusion originally drawn by "an eminent historian and antiquary, Sir Francis Palgrave," as long ago as 1844, and adopted by theological writers ever since, that because a bishop of Vienne established Rogation days on account of some alarming terrestrial phenomena which happened in his diocese, therefore the volcanoes of Auvergne were in action at the time. We have two documents which refer to this matter, a letter written by Sidonius Apollinaris (who lived in the very centre of the Chaine des

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